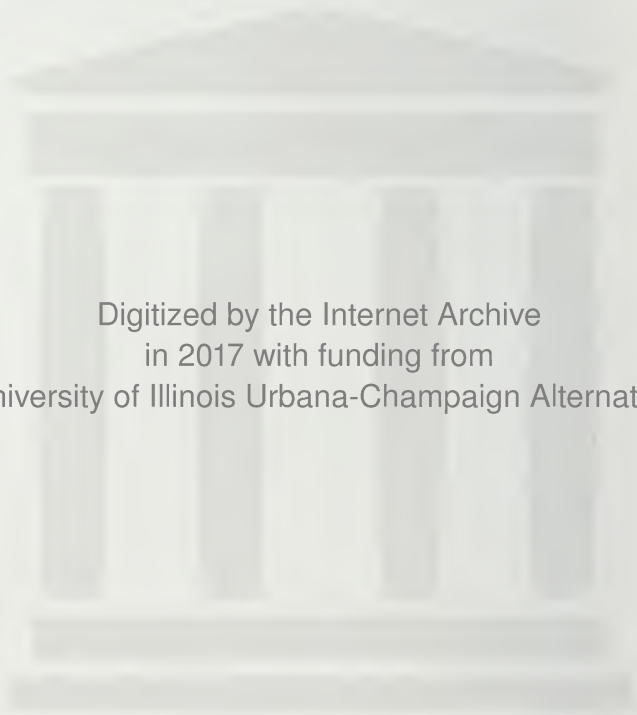


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RELATIVE VALUES OF HUMAN FOODS. By Maj. HENRY E. ALVORD,
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[ABSTRACT.]

THERE are different ways of comparing human foods upon the score of economy. If one attempts to consider at once their digestibility, chemical composition and usual cost, besides other conditions which should not be ignored, the problem becomes very complex. It is hard to define the average human stomach, and we are so much in the dark on the questions of actual proportions of digestibility in different forms of food, that it is safer to drop this factor than to include it. Chemical knowledge of foods and their market prices, are sufficient, when combined, to form an interesting study.

The basis selected for comparison is all-important. A casual observation shows the necessity of separating foods into two grand divisions, animal and vegetable, and of selecting a basis for each.

If any food could be found in common use, at a fairly steady price and useful only for its protein, the direct value or cost of protein could be determined. This being impracticable, a standard food, like average ox-beef, flesh free from bone, may be taken and the cost of protein obtained by difference. We will assume that the fats of average beef and pure lard are equivalent in nutrition and wholly digestible, and take lard at 12 cents per pound as the safest base for animal foods. In average ox-beef there are 5.2 per cent of fats and 23.4 per cent of protein. Placing such beef at 16 cts. per pound, the account will stand thus per hundred-weight:

100 lbs. beef	\$ 16.00
5.2 " fat624
21.4 " protein	15.376
	(504)

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From these figures is obtained the cost of nutrients in animal foods, viz. :—protein, 72 cts. pr. lb. ; fats, 12 cts. ; carbohydrates, 7 cts.

The old German ratio of carbohydrates and fats of 1 : 2.5 so largely adopted in this country was never fully accepted and later investigations show its inaccuracy. We are well supported in substituting 1 : 1.75. Therefore to get carbohydrates from fats, deduct 43 per cent from the latter.

For vegetable foods, the potato is unquestionably the best basis, and the price per bushel is taken at 60 cts. or \$1.00 per cwt. Four cents is assigned as the value of the unextracted starch and the other carbohydrates, and by a calculation analogous to that for beef, potatoes being rated as about 20 per cent carbohydrates, the value of nutritious matter in vegetable foods is fixed thus :

Protein, 10 cts. per lb. ; carbohydrates, 4 cts. per lb.

Based upon these values, the following table has been compiled.

It gives the chief nutrients, the value and average price, approximately, of 100 pounds of thirty common articles of food, half animal and half vegetable. The fats are included in the column headed carbohydrates. A column is added at the right indicating by the signs, plus and minus, whether the usual selling price, as stated, is more or less than the food value, computed as above.

[See Table on next page.]

The figures for the chemical composition of the foods named are taken from such authority (see appended Note) that they can hardly be questioned. If exceptions are taken to the assumed prices of the basic articles, it is manifest that by a simple calculation based upon actually existing market rates, the columns of food values may be easily reconstructed to suit any given locality.

The column of average market price is simply for illustration and will vary with time and place.

This inquiry into the relative value of human foods was instituted for the purpose of making an accurate economic comparison between the different products of the dairy and between those and standard articles of diet. Attention is invited to these facts, as exhibited by the table.

COMPOSITION AND VALUE OF FOODS.

PER ONE HUNDRED POUNDS.						Price g't'r + or less — than value =
NAME.	Protein.	Carbo- Hydrates	Value.	Average Market Price.		
Standard Cows' Milk.....	4 00	10 52	\$3 54	\$3 25	a	—
Cows' Milk (average all kinds)....	3 41	11 23	3 24	2 79	b	—
Skimmed Milk	3 06	6 15	2 63	1 77	c	—
Butter-milk	3 78	5 89	3 13	1 77	d	—
Cream.....	3 70	48 51	6 06	12 50		+
Butter	0 86	146 05	10 67	25 00		+
Fat Cheese	27 16	55 78	23 46	14 00		—
Average Ox Beef.....	21 39	9 08	16 32	16 32		=
Fat Veal.....	18 88	13 89	14 57	15 00		+
Fat Mutton.....	14 80	63 73	15 12	15 00		—
Fat Pork	14 54	65 35	15 04	13 00		—
Domestic Fowl (fat)	18 49	17 54	14 54	16 00		+
Hens' Eggs.....	12 55	21 74	10 56	10 65	e	+
Salmon.....	13 10	12 67	10 32	30 00		+
Mackerel	23 42	11 83	17 69	10 00		—
Cod Fish (dried)	17 90	2 25	13 05	8 00		—
Oysters.....	4 95	3 27	3 97	10 00		+
Fine Wheat Flour.....	8 91	76 12	3 94	3 00		—
Fine Wheat Bread	6 82	53 69	2 83	4 00		+
Oat Meal	15 50	74 37	4 52	3 00		—
Potatoes	1 79	20 84	1 01	1 00		=
Rice	1 81	76 61	3 24	6 00		+
Beans	23 56	52 10	4 44	4 00		—
Pease.....	22 63	56 25	4 51	5 00		+
Cabbage.....	2 95	9 24	0 66	1 00		+
Onions (red)	1 68	10 99	0 61	2 00		+
Tomatoes	1 25	4 66	0 31	2 00		+
Cane Sugar.....	0 35	96 73	3 90	6 00		+
Honey.....	1 29	81 43	3 39	25 00		+
Apples	0 39	13 74	0 59			+
Peaches	0 65	12 57	0 57			+
Grapes	0 59	17 11	0 74			+
Strawberries	1 07	8 48	0 45			+
Dried Apples.....	1 06	55 97	2 35			+

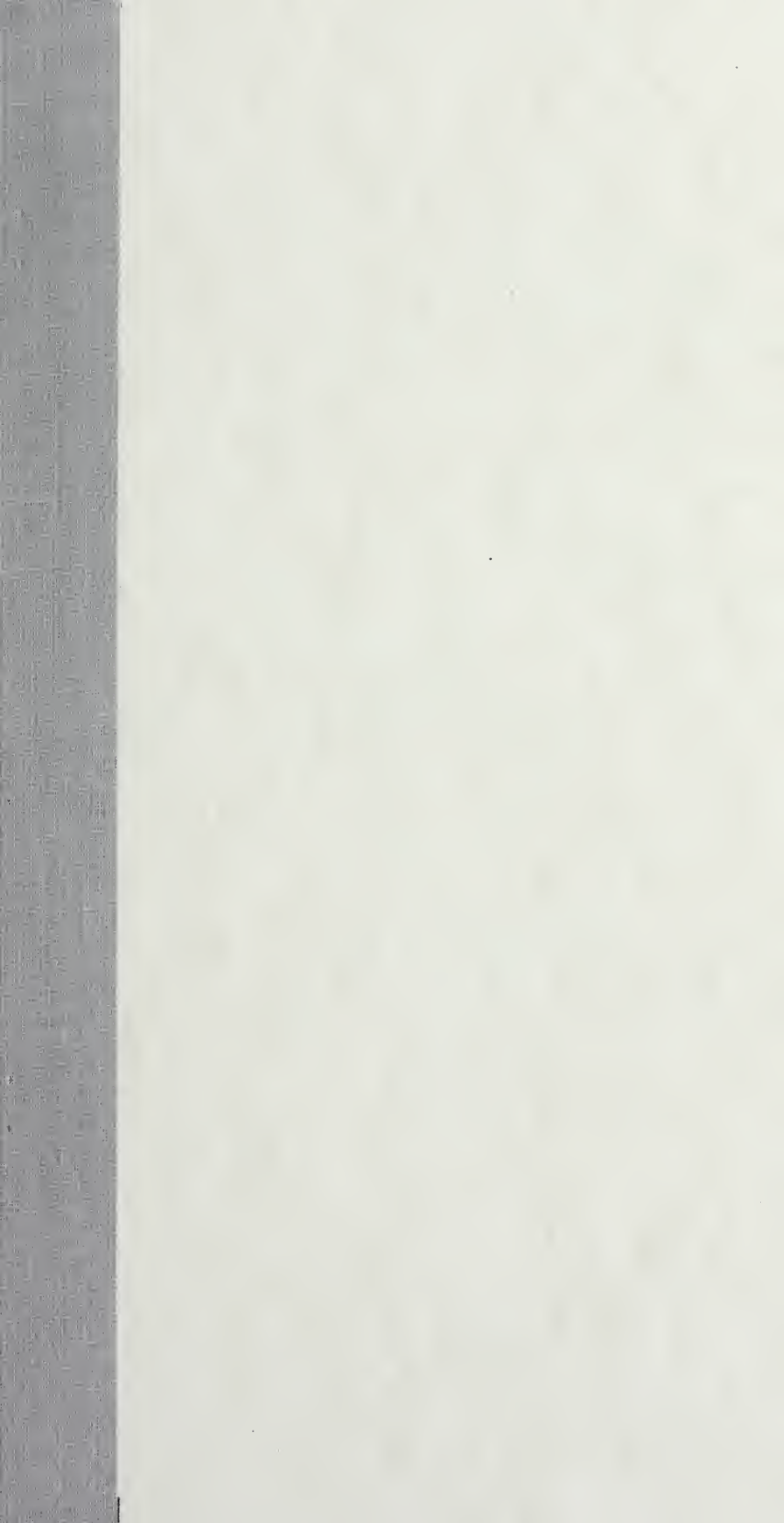
Notes:—a, 7c. per qt.; b, 6c. per qt.; c, 4c. per qt.; d, 4c. per qt.; e, 16c. per dozen

Skim-milk, butter-milk and cheese at their usual retail prices, are cheaper as nutritious food than any other articles on the list, and are approached in this respect only by fresh mackerel and dried cod-fish. On the contrary, butter costs two or three times its real food value, and often more. What shall be said of domestic economy in America, where more butter and less cheese are consumed per capita than in any other nation in our zone? And of the government of some of our great cities where Boards of Health absolutely prohibit the sale of skimmed milk and actually destroy all that can be found? Of butchers' meats, pork and mutton are the cheapest and veal the dearest. Of fish, mackerel is the cheapest while salmon and oysters are about as dear relatively as butter.

Eggs generally sell at their full food value. Wheat-flour, oat-meal and beans are the cheapest forms of vegetable food, nearly all other vegetables (except potatoes) as well as the fruits, costing more than they are worth for their nutritive properties alone.

GENERAL NOTE: Additional Tables have been prepared to accompany the foregoing on the same plan, but with several additional columns for chemical composition, embracing also every known article of human food. As illustrating their completeness, this classified summary is given: flesh, 19 articles; fish, 14 articles; fowl, eggs and game, 12 articles; dairy products, 18 articles; cereals and legumes, 10 articles; flour, meal, bread, etc., 17 articles; vegetables, 20 articles; fruits, 20 articles, and sweets 5 articles: in all 135 articles. To these have been added a Table, giving the amounts, composition and nutritive ratio of food actually consumed by persons of different ages and in varied occupations, as observed in 32 individuals. All these Tables are compilations only and are mainly translated from the work of Dr. J. Koenig entitled *Zusammensetzung der menschlichen Nahrungs und Genussmittel*.

Dr. Koenig collected his analyses from the best chemists, naming his authorities, and in most cases gives the mean of a number of analyses, — as for example, 37 for beef, 184 for wheat, 70 for potatoes, 57 for sugar, 17 for apples, 89 for butter, 100 for cheese and 339 for milk. The labor of translation, with the recalculation of weights, values, etc., and careful verification, has been performed by Mr. F. E. Emery, B.S., of Maine, my principal assistant in the Experiment Department of Houghton Farm.



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